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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/512,149	02/23/2000	Vishnu K Agarwal	MI22-1322	3457

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EXAMINER

PIZARRO CRESPO, MARCOS D

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 12/05/2001

17

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/512,149

Applicant(s)

AGARWAL, VISHNU K

Examiner

Marcos D. Pizarro-Crespo

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 03 October 2001 is: a) ☒ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 14 6) ☐ Other:

Attorney's Docket Number: MI22-1322

Filing Date: 2/23/2000

Claimed Foreign Priority Date: none

Applicant(s): Agarwal

Examiner: Marcos D. Pizarro-Crespo

DETAILED ACTION

This Office action is in response to the amendment filed 10/3/2001 (paper no. 16).

Acknowledgment

1. The amendment filed on 10/23/2001 (paper no. 16) in response to the Office action mailed on 9/6/2001 (paper no. 13) has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1 and 4-16.

Drawings

2. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 10/3/2001 have been approved.
3. The corrected or substitute drawings were received on 10/3/2001. These drawings are acceptable.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 11-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. The limitations recited in claim 11, which depends on claim 1, are inconsistent with the limitations recited in claim 1. Claim 1 (lines 7-9) recites that a high-K crystalline material is over a high-K amorphous material, whereas claim 11 (lines 3-5) recites that the high-K crystalline material is between a semiconductor substrate and the high-K amorphous material. Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 4-11 and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Ramakrishnan (US 5,192,871).

9. Ramakrishnan shows all aspects of the instant invention including an integrated circuitry comprising a capacitor comprising (figure 2):

- a first capacitor electrode **14**
- a second capacitor electrode **20**
- a high dielectric constant layer between the capacitor electrodes comprising:
 - an amorphous material layer **18**
 - a crystalline material layer **16** over the amorphous material layer **22**

10. Regarding claim 4, Ramakrishnan shows at least one of the first and second electrodes comprises a metal (col.1/ll.60).

11. Regarding claims 5-9 and 15, Ramakrishnan's figure 2 shows:

- the capacitor over a semiconductor substrate **12**
- the dielectric layer received between the first and second capacitor plates **14 20**
- the amorphous dielectric layer **18** contacting the first capacitor plate **14**
- the crystalline dielectric layer **16** contacting the second capacitor plate **20**
- the dielectric layer as the only capacitor dielectric region between the capacitor electrodes **14 20**
- the amorphous material layer **18** received between the semiconductor substrate **12** and the crystalline dielectric layer **16**

12. Regarding claim 10, Ramakrishnan discloses the amorphous dielectric material as an amorphous material (100% amorphous), whereas the crystalline dielectric material should be completely crystalline so as to have the highest possible dielectric layer (col.2/ll.34-57).

13. Regarding claims 11, 13 and 14, Ramakrishnan's figure 1 shows an alternative embodiment to figure 1 where the crystalline dielectric layer **16** is between the semiconductor substrate **12** and the amorphous dielectric layer **18**.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramakrishnan, as applied to claim 1 above, and further in view of Graettinger (US 5,844,771).

16. Ramakrishnan shows most aspects of the instant invention but a capacitor wherein the semiconductor substrate comprises bulk monocrystalline silicon (see paragraphs 8-12). Graettinger teaches that in the processing of integrated circuits the substrate typically comprises monocrystalline silicon (col.1/ll.20-24). It would have been obvious at the time of the invention to one of ordinary skill in the art to have the substrate of Ramakrishnan comprising monocrystalline silicon, as suggested by Graettinger, because in the processing of integrated circuits the substrate is typically monocrystalline silicon.

Response to Arguments

17. Applicant's arguments with respect to claim 1 and 4-16 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

18. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(703) 308-7722** or **-7724**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

Art Unit: 2814

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Marcos D. Pizarro-Crespo** at **(703) 308-6558** and between the hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via Marcos.Pizarro@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (703) 306-2794.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 308-0956**.

20. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/310, 438/240, 361/313	11/28/2001
Other Documentation:	
Electronic Database(s): EAST (USPAT, EPO, JPO)	11/28/2001

Marcos D. Pizarro-Crespo

Patent Examiner

Group Art Unit 2814

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MDP/mdp
10/16/2000

[Handwritten Signature]
Patent Examiner
T. Chaudhuri 2000